



# The Energy Story

## Chapter 8: Ocean Energy

The world's ocean may eventually provide us with energy to power our homes and businesses. Right now, most ocean energy power plants are only experimental and are fairly small. But how can we get energy from the ocean?

There are three basic ways to tap the ocean for its energy. We can use the ocean's waves, we can use the ocean's high and low tides, or we can use temperature differences in the water. Let's take a look at each.

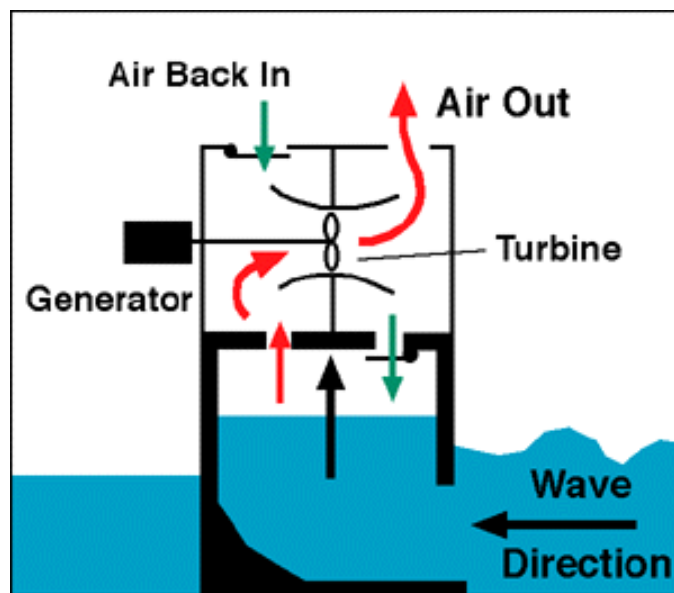
### Wave Energy

Kinetic energy (movement) exists in the moving waves of the ocean. That energy can be used to power a turbine. In this simple example, to the right, the wave rises into a chamber. The rising water forces the air out of the chamber. The moving air spins a turbine which can turn a generator.

When the wave goes down, air flows through the turbine and back into the chamber through doors that are normally closed.

This is only one type of wave-energy system. Others actually use the up and down motion of the wave to power a piston that moves up and down inside a cylinder. That piston can also turn a generator.

Most wave-energy systems are very small. But, they can be used to power a warning buoy or a small light house.



### Tidal Energy

Another form of ocean energy is called tidal energy. When tides come into the shore, they can be trapped in reservoirs behind dams. Then when the tide drops, the water behind the dam can be let out just like in a regular hydroelectric power plant.

In order for this to work well, you need large increases in tides. An increase of at least 16 feet between low tide to high tide is needed. There are only a few places where this tide change occurs around the earth. Some power plants are already operating using this idea. One plant in France makes enough energy from tides to power 240,000 homes.

## Ocean Thermal Energy

The final ocean energy idea uses temperature differences in the ocean. If you ever went swimming in the ocean and dove deep below the surface, you would have noticed that the water gets colder the deeper you go. It's warmer on the surface because sunlight warms the water. But below the surface, the ocean gets very cold. That's why scuba divers wear wet suits when they dive down deep. Their wet suits trapped their body heat to keep them warm.

Power plants can be built that use this difference in temperature to make energy. A difference of at least 38 degrees Fahrenheit is needed between the warmer surface water and the colder deep ocean water.

Using this type of energy source is called Ocean Thermal Energy Conversion or OTEC. It is being used in both Japan and in Hawaii in some demonstration projects.

## Here's What We Learned

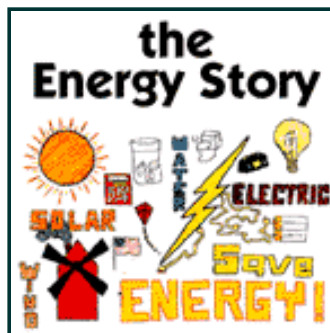
1. The ocean's energy can be used three basic ways.
2. Wave energy systems use the up and down motion of waves to turn a turbine and/or generator.
3. Tide energy systems traps high tides in a reservoir. When the tide drops, the water behind the reservoir can flow through a power plant, just like a regular hydroelectric plant.
4. Ocean thermal energy conversion uses the difference in temperature between warm surface water and cold deep ocean water to make electricity.

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